WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: 2005MO51B

Title: Characterization and Biological Effect Study of Endocrine Disruptors in Indian Creek, Newton, County, Missouri

Project Type: Research

Focus Categories: Water Quality, Toxic Substances, Nitrate Contamination

Keywords: estrogenic chemicals, endocrine disruptors, MCF-7 cell proliferation, sewage treatment effluents, nitrate contamination

Start Date: 03/01/2005

End Date: 02/28/2006

Federal Funds: $22,000

Non-Federal Matching Funds: $51,963

Congressional District: 9th

Principal Investigators:
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Abstract

Many environmental substances possess estrogenic activity. Studies have shown that exposure to these chemicals can cause abnormality and failure in reproduction. Indian Creek in the Elk River Basin in southwest Missouri has a large aggregate of poultry and turkey farming operations. Animal waste which contains steroid metabolites is applied to crop lands. Corn and soybean croplands use herbicides such as atrazine which has been shown to be estrogenic to wildlife. Up to date, there is no study on potential runoff of these chemicals and their biological impacts in Indian Creek in Newton County, Missouri. The objectives of this project are to identify putative estrogenic chemicals in Indian Creek and to assess total estrogenicity of these chemicals in the water. Water samples will be extracted with C18 columns. An aliquot of the extract will be subject to gas chromatography-mass spectrometry (GC/MS) analysis to identify endocrine modulators whereas the rest of the extract will be reconstituted in DMSO to perform a MCF-7 cell proliferation test.

The significance of this proposed study is that this is the first effort to identify estrogenic chemicals and to assess their possible effects on biological systems in an area where both poultry and turkey farming operations and crop growing activities are very active. This research is relevant to the concern of ecological impact and public health. The data may also be used by state and federal agencies for environmental risk assessment.